DEPARTMENT OF ENVIRONMENTAL QUALITY
PERMITTING and COMPLIANCE DIVISION
MONTANA POLLUTANT DISCHARGE ELIMINATION SYSTEM (MPDES)

Permit Statement of Basis (SOB)

PERMITTEE: Imerys Talc America, Inc.

PERMIT NO.: MT0027821

RECEIVING WATER: Unnamed tributary to Middle Fork Stone Creek

FACILITY INFORMATION

Name: Beaverhead Mine

Location: Township 7 South, Range 6 West, East ½ of Section 14
Outfall 001: 45°13’07”N, -112°17’49”W
Madison County
25 Miles Southwest of Alder, MT

Contacts: Mr. Nicholas Brundin, Mine Manager
PO Box 130
Cameron, MT 59720
(406) 682-4882x226

Ms. Sandy Burns, EHS Coordinator
28769 Sappington Road
Three Forks, MT 59752
(406) 285-5171

FEE INFORMATION

Number of Outfalls: 1 (For Fee Determination Only)

Type of Outfall: 001 Mine Drainage, Minor Industrial

I. Permit Status

The existing MPDES permit for Beaverhead Mine was issued to Rio Tinto Minerals on November 13, 2006, became effective on January 1, 2007, and expired on December 31, 2011 ('2007-issued permit'). Prior to this renewal, the previous permit renewal was effective September 1, 1997 ('1997-issued permit').

Luzenac America, Inc. (LAI) submitted a permit renewal application for Beaverhead Mine including Form 1, Form 2C and other supplemental application materials on June 23, 2011, and the $3,000 renewal fee on June 24, 2011. LAI remained the legal entity, although the company was purchased by Rio Tinto, Inc. in 1992. The permit application was considered complete on July 7, 2011, and the existing permit was administratively extended and remains enforceable until such time as a new permit is issued as per Administrative Rules of Montana (ARM) 17.30.1313.

On January 17, 2012, DEQ received notification that the Beaverhead Mine owner/ operator had changed from Luzenac America/Rio Tinto Inc. to Imerys Talc America, Inc. (Imerys).

Although the Beaverhead Mine has not been operational for over 15 years, the facility maintains their Metal Mine Reclamation Act Operating Permit number 00075.

II. Facility Information

A. Facility Description

The Beaverhead Mine was historically an active open-pit talc mining and sorting operation using conventional hard rock mining methods. Surface mining began at this site, known as the Sierra Strip Mine, in the 1950's. Underground operations began at the facility in 1986. Operations at the mine ceased in March 1999, and LAI initiated closure of the underground workings, and began contouring the waste-rock piles and other reclamation work. At the time of closure, the total disturbed area was 99 acres (Administrative Record).

Currently, the facility is undergoing post-closure reclamation stabilization. Seepage from the mine and seepage and run-off from the reclaimed Middle Dump are routed to two sedimentation ponds in series. Settling Pond #1 has a storage capacity of 0.17 acre-feet and overtops into Settling Pond #2, which has a storage capacity of 0.7 acre-feet. A schematic flow line diagram is presented as Attachment I.

The permit renewal application dated June 2011 provided an estimate of daily discharge from Outfall 001 to be approximately 21,400 gallons per day (gpd), which consists of toe seepage into settling ponds (5,800 gpd) and stormwater runoff (15,600 gpd). The average of the flows reported on Discharge Monitoring Reports (DMRs) for January 1, 2009, through June 30, 2014, was 35,000 gpd.

B. Effluent Characteristics

Table 1 summarizes monthly self-monitoring effluent data reported on quarterly DMRs for Outfall 001 during the period of record (POR) of January 1, 2009, through June 30, 2014.

Table 1: Effluent Characteristics for the Period January 1, 2009 – June 30, 2014

Parameter	Location	Units	Previous Limit	Minimum Value	Average Value	Maximum Value	Number of Samples
Flow, Daily Average	Effluent	gpm	(1)	0	24	72	22 (2)
		mgd		0	0.03	0.10	
Total Suspended Solids (TSS)	Effluent	mg/L	(1)	< 10	< 10	13	8
pH (3)	Influent	s.u.	(1)	7.4	--	8.4	7
	Effluent		7.0 – 8.5	7.4	--	9.1	8
Hardness	Effluent	mg/L	(1)	155	169	185	8
Copper, Total Recoverable	Effluent	mg/L	(1)	< 0.001	--	0.003	8
Zinc, Total Recoverable	Effluent	mg/L	(1)	< 0.01	< 0.01	< 0.01	8
Total Kjeldahl Nitrogen, as N	Effluent	mg/L	(1)	< 0.05	--	<0.5	8
Nitrate, as N	Effluent	mg/L	(1)	1.9	5.4	7.2	10 (4)
Oil and Grease	Effluent	mg/L	10 (5)	<1.0	<1.5	2.5	6

Footnotes:
(1) No limit in previous permit; monitoring requirement only.
(2) Discharge was noted for eight of the 22 quarters included in the POR of January 1, 2009 – present. Average values based on those quarters with flow.
(3) Monitoring data supplied as part of the renewal application included two effluent pH analysis that were over 8.5 su (8.7 su in June 2009 and 9.1 su in September 2009); these values were not reflected in the DMRs for that period. However, effluent pH excursions from permit limit at Outfall 001 are allowed as long as it was demonstrated that the pH excursion was a result of biological treatment processes in the settling ponds.
(4) DEQ used all available data since 2007 for nitrate.
(5) Limit in previous permit; no monitoring was required. Analyses provided in renewal application and supplemental submissions.

In addition to effluent limits and monitoring required for Outfall 001 as shown in Table 1, the previous permit included a limit on the increase in turbidity for Middle Fork Stone Creek (MFSC) of five (5) Nephelometric Turbidity Unit (NTU). This is described in Part IV.B.

Discharge from Outfall 001 is intermittent in nature. As shown in Table 1, discharge was reported during eight months of the 22-month POR. There has never been discharge from Outfall 001 reported between October 1st and March 30th based DMRs submitted by the facility since January 1, 2007 – although it is unclear whether there was no flow or whether the facility was not able to monitor the outfall.

Table 2 provides a summary of the seasonal discharge reported on the DMRs.

Table 2: Seasonal Discharge from Outfall 001						
	gallons per minute (million gallons per day)					
	2009	2010	2011	2012	2013	2014
Jan – Mar.	--	--	--	--	--	--
Apr. – Jun	9.5 (0.014)	72 (0.104)	65 (0.094)	0.75 (0.001)	--	10 (0.014)
July – Sept.	5.0 (0.007)	15 (0.022)	15 (0.022)	--	--	NA
Oct. – Dec	--	--	--	--	--	NA

C. Compliance

The following compliance actions occurred between the 2007-issued permit renewal and August 31, 2014:

- DEQ conducted two Compliance Evaluation Inspections (March 23, 2007, and February 24, 2011). No violations were identified.

III. Proposed Technology-Based Effluent Limits (TBELs)

CWA section 402(a)(1) and the Code of Federal Regulations (CFR) at 40 CFR 125.3(a) require that permits contain TBELs that implement the technology-based treatment requirements specified in the CWA. These technology-based requirements may be national technology standards or, in some cases, standards established by the permit writer on a case-by-case basis using Best Professional Judgment (BPJ). TBELs reflect a minimum level of treatment or control for point source discharges. These standards are developed based on the performance of current available treatment and control technologies.

A. Scope and Authority

CWA Section 301 and 40 CFR 122.44(a) require that permits include effluent limitations based on applicable technology-based standards. These requirements are incorporated into Montana regulations at ARM 17.30.1344(2)(e) and ARM 17.30.1207. MPDES permits for industrial facilities must include TBELs that implement any applicable Effluent Limitations Guidelines (ELGs) promulgated by EPA. Montana's Board of Environmental Review (Board) pursuant to 75-5-304(1), Montana Code Annotated (MCA), has adopted effluent limitations and standards and new source performance standards in Title 17, Chapter 30, Subchapter 12 based on the applicable federal regulations.

Pursuant to section 402(a)(2) of the federal CWA [33 U.S.C. 1342(a)(2)], where EPA has not established effluent guidelines that are applicable to a particular class or category of industrial discharger or to a specific discharge, the permit writer establishes applicable technology-based treatment requirements on a case-by-case basis using best professional judgment (BPJ). Regulations for establishing these case-by-case requirements using BPJ are given in 40 CFR 125.3 and ARM 17.30.1203. ARM 17.30.1203(5)(b) grants DEQ authority to impose technology-based treatment requirements on a case-by-case basis using BPJ, using the appropriate factors listed in ARM 17.30.1203(6).

B. Applicable TBELs

EPA has not promulgated effluent guidelines in 40 CFR Subchapter N for facilities in the talc mining industry. Title 40, CFR 436, Subpart AJ (Talc, Steatite, Soapstone, and Pyrophyllite Subcategory) is designated as "reserved." Since this industrial category does not have federal ELGs, applicable TBELs for this permit are established on a case-by-case basis using BPJ.

Historically, the Beaverhead Mine MPDES permits had included a Total Suspended Solids (TSS) effluent limit of 30 mg/L daily maximum (Statement of Basis, 1984 and 1989). In the 1997-issued permit, the TSS concentration limit was replaced by a turbidity limit, which restricted the increase in turbidity in MFSC to 5 NTU. Subsequently, the Beaverhead Mine ceased operating in 1999 and has been reclaimed; however, DEQ retained turbidity, rather than TSS, in the 2007-issued permit.

During this permit renewal DEQ considered the fact that the turbidity limit was implemented as a Water Quality-based Effluent Limit (WQBEL) rather than a TBEL; that there is no applicable ELG for talc mining; and that BPJ has been implemented for similar facilities. Specifically, BPJ limits for TSS of 25 mg/L (average monthly) and 45 mg/L (maximum daily) has been applied at the two active talc mines in the area (Barrett's Minerals' Treasure Mine (MT0029891) since their 2000-issued permit renewal and Imery's Yellowstone Mine (MT0028584) since their 2006-issued permit renewal).

Therefore, DEQ proposes TBELs identical to these talc mines TSS: TSS effluent limits of 25 mg/L (average monthly) and 45 mg/L (maximum daily). These proposed TSS TBELs, summarized in Table 3, will apply at Outfall 001 at any time there is soil-disturbing activity (such as exploration, mining, or reclamation) at Beaverhead mine:

Table 3. Technology-Based Effluent Limits for Outfall 001

Parameter	Units	Maximum Daily Limit	Average Monthly Limit
Total Suspended Solids (TSS)	mg/L	45	25

The TSS TBELs do not apply at this time, as there is currently no activity at the mine.

IV. Proposed Water-Quality Based Effluent Limits (WQBEL)

Section 301(b) of the CWA and 40 CFR 122.44(d), which are incorporated into ARM 17.30.1344 by reference, require that permits include limitations more stringent than limitations based on applicable federal technology-based standards where more stringent limitations are necessary to achieve applicable state water quality standards (WQS).

A. Scope and Authority

Section 303(c) of the CWA requires every state to develop WQS applicable to all water bodies or segments of water bodies within the state. Title 75, Part 3 of the MWQA

specifically requires the Board to establish the classification of all state waters in accordance with their present and future beneficial uses; to formulate and adopt standards of water quality; adopt rules implementing the state's nondegradation policy; and adopt rules governing mixing zones. These components match the basic components of WQS – designated uses, water quality criteria, and an antidegradation policy – required by the federal regulations at 40 CFR Part 131.

The Montana Water Quality Act at 75-5-401(2), MCA states that a permit may only be issued if DEQ finds that the issuance or continuance of the permit will not result in pollution of any state waters. Montana water quality standards at ARM 17.30.637(2) require that no wastes may be discharged such that the waste either alone or in combination with other wastes will violate or can reasonably be expected to violate any standard. ARM 17.30.1344 adopts by reference 40 CFR 122.44 which states that MPDES permits shall include limits on all pollutants which will cause, or have a reasonable potential to cause an excursion of any water quality standard, including narrative standards.

Montana Surface Water Quality Standards and Procedures (ARM 17.30, Subchapter 6) include, by reference, *Circular DEQ-7 Montana Numeric Water Quality Standards* (DEQ-7), and the *Water Quality Standards Handbook*, Second Edition, EPA-823-B-94-005a, August 1994 (WQS Handbook), which sets forth procedures for development of site-specific criteria. Montana's regulations on Nondegradation of Water Quality are in ARM 17.30, Subchapter 7 and regulations on Mixing Zones are in ARM 17.30, Subchapter 5.

B. Receiving Water

The Beaverhead Mine facility discharges through Outfall 001 to an unnamed tributary to the Middle Fork Stone Creek (MFSC). The tributary combines with MFSC approximately 0.15 mile (800 feet) downstream of the outfall. After approximately 3.5 miles, MFSC combines with Left Fork Stone Creek and Mine Gulch to form Stone Creek; this stretch is identified as segment MT41B002_132. Stone Creek discharges to the Beaverhead River, which is a headwater of the Missouri River. The Beaverhead drainage basin has Hydrologic Unit Code (HUC) 10020002, Upper Missouri Basin. The water use classification for the unnamed tributary and MFSC is B-1 [ARM 17.30.610(1)(a)]. Each water body classification has water quality standards designed to ensure that the beneficial uses associated with the classification are protected. The beneficial uses for a water body classified as B-1 are identified in Table 4.

Table 4. Beneficial Uses of Receiving Water

Classification	Beneficial Uses
B-1	• Drinking, culinary and food processing purposes, after conventional treatment • Bathing, swimming, and recreation • Growth and propagation of salmonid fishes and associated aquatic life, waterfowl, and furbearers • Agricultural and industrial water supply

The Middle Dump and Settling Ponds #1 and #2 were constructed in the unnamed tributary drainage. Prior to the construction, a 1973 Environmental Assessment stated that the unnamed tributary contained a small spring running at 1 to 2 gallons per minute (gpm) (Beaverhead Mine Reclamation Plan, September 9, 2003). Most recently, the SOB for the 2007-issued permit characterized the unnamed tributary as an intermittent waterbody.

As defined by ARM 17.30.602, “ephemeral stream" means a stream or part of a stream which flows only in direct response to precipitation in the immediate watershed or in response to the melting of a cover of snow and ice and whose channel bottom is always above the local water table. "Intermittent stream" means a stream or reach of a stream that is below the local water table for at least some part of the year, and obtains its flow from both surface run-off and ground water discharge.

DEQ finds that the receiving water, which is the unnamed tributary, is an intermittent waterbody, based on the fact that it flows partly from ground water discharge. Discharge from Outfall 001 constitutes, effectively, the entire flow in the unnamed tributary (see Attachment I). As stated in Part II.B, there has been no flow from Outfall 001 reported for the months of October to March for any year during the POR of 2007 to the present. Accordingly, the seven-day average 10-year low flow (7Q10) of the unnamed tributary is assumed to be zero.

In addition, MFSC at the confluence with the unnamed tributary is considered intermittent. Table 5 contains a summary of recent water quality for MFSC at monitoring Sites CRK A (100 feet upstream of the tributary confluence) and CRK B (150 feet downstream of the tributary confluence), as reported since January 1, 2009 in the quarterly DMRs.

Table 5: MFSC Characteristics for the Period January 2009 to June 2014

Parameter	Location [1]	Units	Minimum Value	Average Value	Maximum Value	Number of Samples
Flow	CRKA	gpm	0	55	153	22 [2]
	CRKB		0	77	252	22 [2]
Nitrate, as N [3]	CRKA	mg/L	0.05	0.5	0.84	8
	CRKB		0.05	0.5	0.95	8
Total Kjeldahl Nitrogen (TKN)	CRKA	mg/L	<0.05	<0.4	<0.5	8
	CRKB		<0.05	<0.4	<0.5	8
Turbidity [4]	CRKA	NTU	0.9	6.5	15	8
	CRKB		1.8	6.6	14	8
	Increase [5]		-2.0	0.06	4.0	8
Copper, TR	CRKA	mg/L	<0.001	<0.001	0.002	8
Zinc, TR	CRKA	mg/L	<0.01	<0.01	0.02	8
pH	CRKA	su	7.1	7.6	8.1	8
	CRKB		7.1	7.7	8.2	8
Hardness, as $CaCO_3$	CRKB	mg/L	135	141	156	8

Footnotes:
(1) Monitoring location CRKA is on MFSC 100 ft upstream of the unnamed tributary; CRKB is 150 ft downstream.
(2) The average flow is based on the eight of the 22 quarterly samples had documented flow.
(3) The 1997 TMDL approved a 3.0 mg/L nitrate, as nitrogen in-stream standard based on the 1997 permit. This standard was not continued as a limit in the 2007 renewal.
(4) The 1997 TMDL-approved limit of 5 NTU increase above background was continued as a limit in the 2007-issued permit renewal.
(5) The turbidity increase was calculated as part of this renewal; the DMR-reported increase data was flawed.

For purposes of 303(d) determination, MFSC is not distinguished as a separate body of water from the mainstem of Stone Creek. Stone Creek was on the 1996 303(d) List as an impaired water body in need of a Total Maximum Daily Load (TMDL), identified as segment MT41B002-13. Probable causes for the impairment included flow alteration, other habitat alterations, siltation, and turbidity.

Stone Creek (segment MT41B002_132 Stone Creek from Left and Middle Forks to an unnamed tributary) was listed as impaired in 2014 [Clean Water Act Information Center (CWAIC)]. The listed causes were nitrate/nitrite (no TMDL yet developed); turbidity and sedimentation/ siltation (TMDL approved in July 2012); and alteration in stream-side or littoral vegetative covers and low flow alterations (no TMDL required).

On August 28, 1997, EPA Region VIII administrator approved a “point source TMDL” associated with MT0027821, which included turbidity, nitrate, and oil and grease. The 1997-point source TMDL established the following “wasteload allocations” for Beaverhead Mine based on the 1997-issued permit: turbidity at 5 NTU increase above background in MFSC between CRKA and CRKB; nitrate in MFSC at 3.0 mg/L; and oil & grease at 10 mg/L monthly average and 15 mg/L daily maximum.

In 2012, EPA approved the *Beaverhead Sediment Total Maximum Daily Loads and Framework Water Quality Protection Plan*, which provided a TSS wasteload allocation of 0.7 tons per year (1,400 lbs/yr) for the Beaverhead Mine. DEQ finds as part of this permit renewal that the 2012 TSS TMDL supersedes the 1997 turbidity TMDL.

C. Applicable Water Quality Standards

Discharges to surface waters classified B-1 are subject to the specific water quality standards of ARM 17.30.623, as well as the general provision of ARM 17.30.635 through 637, 640, 641, 645 and 646, unless they conflict with ARM 17.30.623 [ARM 17.30.603(3)]. The general provisions of ARM 17.30.637(1) apply to all categories of state surface water. These provisions require that state waters must be free from substances which will:

(a) settle to form objectionable sludge deposits or emulsions beneath the surface of the water or upon adjoining shorelines;

(b) create floating debris, scum, a visible oil film (or be present in concentrations at or in excess of 10 milligrams per liter) or globules of grease or other floating materials;

(c) produce odors, colors or other conditions as to which create a nuisance or render undesirable tastes to fish flesh or make fish inedible;

(d) create concentrations or combinations of materials which are toxic or harmful to human, animal, plant or aquatic life; and

(e) create conditions which produce undesirable aquatic life.

D. Mixing Zone

A mixing zone is an area where the effluent mixes with the receiving water and certain water quality standards may be exceeded [ARM 17.30.502(6)]. DEQ must determine the applicability of currently granted mixing zones [ARM 17.30.505(1)].

The 7Q10 of the unnamed tributary to MFSC is zero, and at times discharge from the Outfall 001 is the only flow in the intermittent drainage. In addition, no mixing zone was provided in the previous permit and none was requested for this renewal. Therefore, no mixing zone shall be issued and effluent limits for Outfall 001 apply at the end of the discharge pipe outlet from "Settling Pond #2."

E. Basis for Water Quality-Based Effluent Limits (WQBELs)

Determining the Need for WQBELs

EPA regulations at 40 CFR 122.44(d), which are incorporated into ARM 17.30.1344 by reference, require that all effluents be assessed by DEQ to determine the need for WQBELs in the permit. 40 CFR 122.44(d)(1)(i) states, "Limitations must be established in permits to control all pollutants or pollutant parameters that are or may be discharged at a level that will cause, have the reasonable potential to cause, or contribute to an excursion above any

state water quality standard." Pollutants and parameters are identified as pollutants of concern (POC) because they:

- Have listed TBELs
- Are identified as needing WQBELs in the previous permit
- Have been identified as present in the effluent through monitoring
- Are listed as present in application forms
- Are pollutants associated with an impairment

The process that DEQ uses to determine whether a WQBEL for a POC is required is called a "reasonable potential analysis (RPA)." RPA is used to determine whether a discharge, alone or in combination with other sources of pollutants to a water body and under some set of conditions arrived at by making a series of reasonable assumptions, might result in an excursion above an applicable water quality standard.

Reasonable Potential (RP) Analysis

ARM 17.30.1345 requires DEQ to develop WQBELs for any pollutant where, after the application of any approved mixing zones, there is RP for discharges to cause or contribute to exceedances of instream numeric or narrative water quality standards. Table 6 lists the basis for identifying the parameters of concern for Beaverhead Mine.

Table 6. Pollutants & Parameters of Concern for WQBELs

Parameter	Basis for Identifying as a POC
Total Suspended Solids (TSS) and Turbidity	TBELs, TMDLs, previous permit
pH	Previous permit, monitoring
Oil & Grease	1997 "Point source TMDL," previous permit, monitoring
Nitrogen & its derivatives	303(d) List, 1997 "Point source TMDL," monitoring
Copper, Total Recoverable	Monitoring
Zinc, Total Recoverable	Monitoring

DEQ uses a mass balance equation to determine RP based on *EPA Technical Support Document for Water Quality-based Toxics Control* (TSD) (EPA/505/2-90-001) (see *Equation 1*). Calculations use the receiving water concentration, the maximum projected effluent concentration, the design flow of the wastewater treatment facility, and the applicable receiving water flow.

As part of this renewal, RP for the Beaverhead Mine discharge to cause exceedances of a WQBEL was evaluated using *Equation 1*:

$$C_r = \frac{(Q_d \times C_d) + (Q_s \times C_s)}{(Q_d + Q_s)}$$

Where:

C_r = resulting receiving water concentration
Q_d = facility critical effluent flow based on discharge over past permit cycle
C_d = maximum discharge concentration during POR x Table 3-2 multiplier
Q_s = available mixing flow of receiving water
C_s = receiving water 75th percentile ambient concentration

If C_r is greater than a WQS, there is RP and an effluent limit must be developed. Since the 7Q10 of the receiving water is zero and no mixing zone is granted, $Q_s = 0$ and *Equation 1* reduces to $C_r = C_d$. Therefore, the criteria for each POC from Beaverhead Mine must be evaluated at the point of discharge.

The projected maximum effluent concentration (C_d) is obtained following the method recommended by the TSD. A multiplier is determined using Table 3-2 in the TSD (based on the data set, coefficient of variation, and sample size at the 95% confidence interval.) The projected maximum effluent concentration is the multiplier times the maximum observed effluent concentration reported by the facility between January 1, 2009, and June 30, 2014 (see Table 7).

Table 7: Maximum Projected Concentrations for POC at Outfall 001 (1)

Parameter	Units	RRV	Maximum Observed	# Samples	TSD Multiplier	C_d (projected maximum)
TSS	mg/L	--	13	8	1.1	14
Oil & Grease (2)	mg/L	1.0	2.5	6	1.9	4.8
Copper, Total Recoverable	µg/L	2	3	8	1.9	5.7
Zinc, Total Recoverable	µg/L	8 (3)	< 10	8	--	10
Nitrate	mg/L	0.02	7.2	10 (4)	1.3	9.4

Footnote:
(1) The turbidity increase is the difference in MFSC from upstream (CRKA) to downstream (CRKB).
(2) Oil & Grease six (6) analyses collected between 6/8/2009 and 8/31/2010 provided with Form 2C.
(3) Prior to 2012, the Required Reporting Value (RRV) for zinc was 10 µg/L. All samples were nondetect.
(4) DEQ used all available data since 2007 to develop C_d for nitrate.

Total Suspended Solids (TSS) and Turbidity

The water quality standards at ARM 17.30.623(1)(f) states no increases are allowed above naturally-occurring concentrations of sediment or suspended sediment, settleable solids, or floating solids, which will or are likely to create a nuisance or render the waters harmful, detrimental, or injurious to public health, recreation, safety, welfare, livestock, wild animals, birds, fish, or other wildlife. The general prohibitions in ARM 17.30.637 state that the discharge shall not create concentrations or combinations of materials, which are toxic or harmful to human, animal, plant or aquatic life.

Downstream from the facility, Stone Creek (MT41B002_132) has been routinely listed on the biennial 303(d) lists as impaired for sediment/siltation and turbidity. In July 2012, EPA approved the Beaverhead Sediment TMDL that included a TSS wasteload allocation of 0.7 tons per year (1,400 lbs/yr) for the Beaverhead Mine. In addition, this MPDES permit renewal includes proposed TSS TBELs of 25 mg/L monthly average and 45 mg/L

maximum daily at any time that the Beaverhead Mine has any mining or other activity. Seven of the eight TSS samples since 2009 were nondetect (< 10 mg/L) and one sample was 13 mg/L. At this time, DEQ finds that no additional TSS WQBELs are required at Outfall 001 for the following reasons: there is a proposed TSS TBEL during any mine activity, there is an annual TSS wasteload allocation for Beaverhead Mine in the TMDL, and there are no other numeric TSS standards.

In addition, Beaverhead Mine is subject to turbidity standards in ARM 17.30 Subchapter 6. The maximum allowed increase in the turbidity in a B-1 receiving water is five (5) NTU above background [ARM 17.30.623(2)(d)]. The MPDES permit for Beaverhead mine has included an allowable net increase of 5 NTU above background in MFSC since the 1997-issued permit renewal. Review of turbidity data provided on DMRs since 2007 shows that, on average, turbidity at downstream monitoring location CRKB is the same as upstream turbidity at CRKA. In fact, of the eight sample sets taken since 2009, only two showed an increase in turbidity: June 2009 showed a 4.0 NTU increase and June 2012 showed a 1.5 NTU increase; both within the '5 NTU above background' standard. The highest upstream turbidity during the POR was 15 NTU; the highest downstream was 14 NTU.

The 5.0 NTU increase limit was approved as part of the 1997-point source TMDL. However, as part of this MPDES permit renewal, DEQ finds the 2012 TMDL WLA for TSS supersedes this requirement and the TSS WLA as well as the TSS concentration-based TBELs are sufficient to protect MFSC. The turbidity increase limit will be removed.

pH

ARM 17.30.623(2)(c) states that the induced variation of hydrogen ion concentration (pH) within the range of 6.5 - 8.5 must be less than 0.5 su. Natural pH outside this range must be maintained without change. Natural pH above 7.0 must be maintained above 7.0.

Historically, the Beaverhead Mine MPDES permits had included an allowable pH range of 6.0 – 9.0 su (Statement of Basis, 1984, 1989, and 1997). The 2007-issued permit changed the allowable pH at Outfall 001 to be between 7.0 to 8.5 su based on ARM 17.30.623(2)(c). To ensure that biological activity was not the cause of a pH increase, the 2007-issued permit also included a Special Condition that allowed the permittee to demonstrate compliance if the effluent pH was above 8.5 su by showing the influent pH was between 6.5 and 8.5 su (therefore attributing the elevated effluent pH to biological activity in the sediment ponds).

The pH levels at Beaverhead Mine Outfall 001 ranged from 7.4 to 9.1 su during the POR. There were three (3) exceedences of the 8.5 su maximum pH limit: 8.8 su in June 2007; 8.7 su in June 2009; and 9.1 su in September 2009. Beaverhead Mine did not submit influent information to demonstrate that any of the excursions were due to biological activity.

The 2007-issued permit also required pH monitoring in MFSC, both upstream and downstream of the unnamed tributary. During the same time frame as the effluent monitoring, the average pH increase in MFSC was 0.1 su, and the largest pH increase was

0.3 su in June 2011 (difference between 7.5 su upstream and 7.8 su downstream). Therefore, with an effluent pH within the range of 7.4 to 9.1 su, discharge from the Mine did not cause the pH to increase more than the standard of 0.5 su above background.

ARM 17.30 Subchapter 6 does not include exceptions for biological activity. Therefore, DEQ will require the effluent pH, as monitored at Outfall 001, to be 7.0 – 9.0 su. This will ensure that the narrative standards in ARM 17.30.623(2)(c) will be protected.

Oil and Grease (O&G)

ARM 17.30.637(1)(b) states that discharge shall not create a visible oil film or globules of grease, or be present in concentrations at or in excess of 10 mg/L. The 1997-issued permit included O&G limits of 10 mg/L monthly average and 15 mg/L instantaneous maximum and no visible sheen; visual monitoring was required daily during days of operation with additional monitoring activity required if a sheen was observed. As discussed in Part IV.B., a WLA for oil & grease was included in the 1997-point source TMDL based on the 1997-issued permit; however, activity at the mine has been discontinued since 1999. Subsequently, the 2007-issued permit included the narrative O&G limits of 10 mg/L and a prohibition on causing a visible sheen; however, compliance monitoring was not required.

The results for six oil & grease analyses taken between 2009 and 2011 were submitted as part of the renewal package and supplemental information. Four samples showed nondetect at 1.0 mg/L, one sample showed 2.2 mg/L, and one sample showed 2.5 mg/L. Using the TSD method, the projected maximum effluent concentration is 4.8 mg/L (maximum observed concentration of 2.5 mg/L x the TSD multiplier in Table 3-2 of 1.9). Since the projected maximum of 4.8 mg/L is below the 10 mg/L standard, there is no RP to exceed water quality standards.

In summary, the Mine does not have RP to exceed the O&G standard, operations at the site ceased 15 years ago and there is no equipment or other known source of oil contaminants onsite, and the mine has undergone stabilization and reclamation. However, until the 1997-point source TMDL is repealed, DEQ will maintain the general narrative condition under ARM 17.30.637(1) State surface waters must be free from substances attributable to municipal, industrial, agricultural practices or other discharges that will: … (b) create floating debris, scum, a visible oil film (or be present in concentrations at or in excess of 10 milligrams per liter), or globules of grease or other floating materials."

Monthly visual monitoring will be required during July through September; in addition, oil & grease sample analysis will be required once per year plus anytime a visible sheen is noted.

Copper and Zinc

The 2007-issued permit identified copper and zinc as POC, based on analytical results provided with the renewal application. ARM 17.30.623(2)(h) states that concentrations of carcinogenic, bioconcentrating, toxic or harmful parameters which would remain in the water after conventional treatment may not exceed the applicable standards set forth in Circular DEQ-7. There was insufficient data to evaluate RP and monitoring was required.

Based on data acquired during the previous five years, DEQ calculated the projected maximum pollutant concentrations (see Table 7) and compared it to the aquatic life standards (acute and chronic) and human health standards (HHS) in Table 8:

Table 8: RPA for Copper and Zinc.

		C_d	WQS (C_s)			RP?
Parameter	Units	Projected maximum	Acute(1)	Chronic(1)	HHS	Limit needed (Y/N)
Copper, Total Recoverable	µg/L	5.7	18.8	12.2	1,300	No, $C_d < C_s$
Zinc, Total Recoverable	µg/L	< 10	156	156	2,000	No, $C_d < C_s$

Footnote:
(1) Acute and chronic WQS based on the 25th percentile hardness in MFSC of 137 mg/L as $CaCO_3$.

There is not RP to exceed either total recoverable copper or total recoverable zinc standards. No limit or further monitoring is necessary.

Nitrogen

Nitrate and Nitrate+Nitrite

State surface waters must be free from substances attributable to discharges that will create concentrations or combinations of materials which are toxic or harmful to human, animal, plant or aquatic life; and create conditions which produce undesirable aquatic life [ARM 17.30.637(1)(d) and (e)]. Although the immediate receiving water body does not have any listed impairments, nitrate/nitrite is listed on the 2014 303(d) List as a probable cause of impairment for aquatic life downstream in Stone Creek (segment ID#MT41B002_132). A TMDL is required but has not been completed.

The 1997-point source TMDL included a maximum instream concentration for MFSC of 3.0 mg/L nitrate, as recommended by the federal Bureau of Land Management (BLM). Correspondence at that time indicated that this instream standard was designed to be temporary, to allow for one to two years of data collection (DEQ letter to BLM, May 7, 1997). DEQ determined during the previous permit renewal that the mine did not have reasonable potential to cause or contribute to the exceedence of 3.0 mg/L nitrate. Therefore the 2007-issued permit did not include a nitrate or nitrogen limit; however, monitoring was continued (Fact Sheet August 2006, Part IV.E).

The human health standards (HHS) for both nitrate and nitrate+nitrite are 10 mg/L (Circular DEQ-7, 2012). During the previous permit cycle, the maximum nitrate concentration was 7.2 mg/L, and the average was 5.4 mg/L, based on the 10 samples between January 2007 and the present. These concentrations are slightly reduced from the previous period of record (2000 to 2006) which had a maximum of 8.3 mg/L and an average of 5.7 mg/L; and drastically reduced from the previous period (up to the 1994 renewal application) which had a maximum concentration of 11.9 mg/L and an average of 9.3 mg/L nitrate-nitrite.

Based on current conditions, the projected maximum nitrate concentration is 9.4 mg/L, based on 7.2 mg/L (the maximum observed concentration during the POR since 2007) x 1.3 (the TSD Table 3-2 multiplier). The projected maximum concentration is below the 10 mg/L HHS and there is not RP to exceed the HHS of 10 mg/L. No WQBEL is needed. Monthly monitoring will be required in MFSC at monitoring site CRKB during the summer months (July, August, and September) to compare against the 3.0 mg/L WLA.

Total Nitrogen

State surface waters must be free from substances attributable to discharges that will create concentrations or combinations of materials which are toxic or harmful to human, animal, plant or aquatic life; and create conditions which produce undesirable aquatic life [ARM 17.30.637(1)(d) and (e)]. Nitrogen is a plant growth nutrient and is of concern because the addition of nitrogen from the mine may have an impact on the aquatic habitat and populations in the receiving water.

On July 25, 2014, the Board and DEQ approved Circular DEQ-12A (Base Numeric Nutrient Standards, July 2014 edition) and Circular DEQ-12B (Nutrient Standard Variances, July 2014 edition), respectively. The criteria in Circular DEQ-12A that apply to MFSC, located within the Middle Rockies ecoregion, is a total nitrogen standard of 0.3 mg/L, for the period July 1st – September 30th.

Circular DEQ-12A Section 2.2 states that when developing TN average monthly limits (AML) the seasonal lowest 14-day flow observed in five years (14Q5) should be used. According to the DMRs submitted by Imerys during the POR, the 14Q5 data for the season of July 1 – September 30th for the unnamed tributary (or MFSC) is 0 cfs, since no flow was observed July – September 2012 and July – September 2013.

With no dilution flow, the standard of 0.3 mg/L TN would have to be met at 'end of pipe' at Outfall 001. This is not currently possible as discussed above, the projected maximum concentration in the effluent is currently 9.4 mg/L nitrate, which is approximately equivalent to TN since the Total Kjeldahl Nitrogen (TKN) concentration is typically nondetect.

Montana State Law (§75-5-103(22) and 75-5-313, MCA) allows for variances from the base numeric nutrient standards found in Circular DEQ-12A. The Nutrient Standards Variances are laid out in Circular DEQ-12B. As the Mine's sediment ponds are most closely characterized as "lagoons not designed to actively remove nutrients" in Table 12B-1, the nutrient standards general variance applicable to Beaverhead Mine is "maintain current performance." The variance is designed to be a technically-achievable level, expressed as an average monthly load limit. Imerys sent a letter requesting coverage under the general variance to DEQ on October 8, 2014.

Review of monitoring data for Outfall 001 since 2007 shows that the average TN concentration was 5.4 mg/L. Therefore, the LTA = 5.4 mg/L. The Average Monthly

Limit (AML) is calculated from the LTA based on Table 5-2 of the TSD (cv = 0.3, 95th percentile, n=4), AML = 5.4 x 1.26 = 6.8 mg/L. In order to cap at current performance, the AML is multiplied by the maximum 30-day average flow rate for the POR, which was 72 gpm (0.1 MGD), as follows: 6.8 mg/L x 0.1 MGD x 8.34 = 5.7 lb/day

F. Proposed Water Quality-Based Effluent Limits

Table 9. Proposed WQBELs for Outfall 001

Parameter	Units	Maximum Daily Limit	Average Monthly Limit	Basis
pH	su	7.0 – 9.0	NA	ARM 17.30.623(2)(c)
Total Nitrogen (TN) (1)	lb/day	NA	5.7	Circulars DEQ-12A & 12B

Footnote:
(1) TN limit is effective from July 1st – September 30th, only.

The instantaneous maximum limitation for oil & grease in any grab sample shall not exceed 10 mg/L.

There shall be no discharge which causes visible oil sheen in the receiving stream.

V. Final Limitations

A. Outfall 001 Effluent Limits

Section 402(o) of the CWA and 40 CFR 122.44(l) require that effluent limitations or conditions in reissued permits be at least as stringent as those in the existing permit, with certain exceptions. Also, regulations at 40 CFR 122.44 require that permits contain the more stringent TBEL or WQBEL limitation applicable to an individual pollutant.

As discussed in Part IV.E, DEQ considered the proposed permit limits to ensure that they were as stringent as previous limits, or met the anti-backsliding requirements.

Outfall 001 –

Beginning on the effective date of this permit and lasting through the term of the permit, the discharge from Outfall 001 shall, at a minimum, meet the effluent limits presented in Table 10:

Table 10: Final Effluent Limits for Outfall 001

Parameter	Units	Maximum Daily Limit	Average Monthly Limit	Basis
Total Suspended Solids (TSS)	mg/L	45 (1)	25 (1)	ARM 17.30.1203(3)(a)(ii)
	lb/yr	(2)	(2)	Beaverhead Sediment TMDL
pH	su	7.0 – 9.0		ARM 17.30.623(2)(c)
Total Nitrogen (TN)	lb/day	NA	5.7 (3)	Circular DEQ-12A & 12B

Footnote:
(1) TSS concentration-based TBEL in effect only during times when mining or other construction-type activity occurs at the Beaverhead Mine.
(2) TSS WLA of 1,400 lb/year in Beaverhead Sediment TMDL approved by EPA in 2012.
(3) TN limit load-based limit is effective from July 1st – September 30th, only.

The instantaneous maximum limitation for oil & grease in any grab sample shall not exceed 10 mg/L.

There shall be no discharge which causes visible oil sheen in the receiving stream.

VI. Monitoring Requirements

Regulations requiring the establishment of monitoring and reporting conditions in MPDES permits are found at 40 CFR 122.44(i) and 122.48, and ARM 17.30.1351. All analytical procedures must comply with the specifications of 40 CFR Part 136 and the analysis must meet any Required Reporting Values (RRVs) listed in Circular DEQ-7 unless otherwise specified. Samples shall be collected, preserved and analyzed in accordance with approved procedures listed in 40 CFR 136.

Outfall 001 –

Effluent monitoring requirements are summarized in Table 11. Because the mine is closed and both difficult and potentially dangerous to approach between October – late spring, as well as the fact that the nutrient standards are applicable only during July – September, monitoring will be required monthly for June through September.

Table 11: Monitoring Requirements for Outfall 001			
Parameter	**Units**	**Sample Frequency**	**Sample Type**
Flow	mgd	Monthly (1)	Instantaneous
Total Suspended Solids	mg/L	Annual (2)	Grab
pH	s.u.	Monthly (1)	Instantaneous
Oil & Grease – sheen (4)	Y/N	Monthly (1)	Visual
Oil & Grease (4)	mg/L	Annual	Grab
Nitrate	mg/L	Monthly (3)	Grab
Total Kjeldahl Nitrogen	mg/L	Monthly (3)	Grab
Total Nitrogen	lb/day	Monthly (3)	Calculated

Footnotes:
(1) Monitoring required monthly during the four months of June - September.
(2) TSS sampling must be conducted annually sometime during the months of June – September. In addition, monthly monitoring will be required upon initiation of any soil-disturbing activities.
(3) Monitoring required monthly during the three months of July - September.
(4) A sample must be taken and analyzed for oil & grease per accepted method under 40 CFR 136 once per year, plus any time a visible sheen is observed.

Middle Fork Stone Creek – Site CRKB

In order to document that the Beaverhead Mine does not cause MFSC to exceed the WLA of 3.0 mg/L nitrate as approved by EPA in the 1997-point source TMDL, the permittee shall monitor for nitrate concentration once per month during the summer months of July, August, and September. The monitoring location remains CRKB, which is located approximately 150 feet downstream from the location the unnamed receiving water discharges to the MFSC, unless another location is submitted to DEQ, in writing. The monitoring location must be marked with a sign.

VII. Special Conditions

A. Nutrient Variance – Optimization Study

Permittees receiving a general variance are required to evaluate current facility conditions in order to optimize nutrient reductions within the existing infrastructure and shall analyze cost-effective methods of reducing nutrient loading including, but not limited to, nutrient trading [§75-5-313(9), MCA]. In order to ensure continual progress, DEQ is requiring Beaverhead Mine conduct the following:

1. Identify specific nutrient (nitrogen) sources contributing to the effluent in Outfall 001, including concentrations, volume and frequency.
2. Compare future anticipated nutrient (nitrogen) monthly loads to future projected nutrient standards.
3. Evaluate options for mitigating nutrients (nitrogen) before, during, and/or after retention by the settling pond system. Include cost and expected efficacy.

4. Prepare a report ("Optimization Study") based on the above evaluation and any additional developments (including DEQ guidance, technical literature, etc.) and submit to the DEQ by no later than July 1, 2019.

By no later than January 28th of each year beginning in 2016, Imerys shall submit an annual report documenting progress made during the previous year and the planned actions for the upcoming year.

B. Notification Prior to Mining Activity

Imerys must notify DEQ at least 30 days prior to initiating any soil-disturbing activity at Beaverhead Mine. Examples of soil-disturbing activities include, but are not limited to, mining and site stabilization activities. The notification must include the anticipated start-up date and a description of the activity. TSS concentration limits (25 mg/L 30-day average, 45 mg/L maximum daily limit) will be effective the date of start-up. Monthly monitoring of TSS will be required until soil-disturbing activities have ceased.

VIII. Other Information

On September 21, 2000, a U.S. District Judge issued an order stating that until all necessary total maximum daily loads (TMDLs) under Section 303(d) of the Clean Water Act are established for a particular water quality limited segment (WQLS), the State is not to issue any new permits or increases under the MPDES program. The order was issued in the lawsuit Friends of the Wild Swan v. U.S. EPA, et al. (CV 97-35-M-DWM), District of Montana and Missoula Division.

The DEQ finds that renewal of this permit does not conflict with Judge Molloy's Order (CV 97-35-M-DVM) because TMDLs associated with the discharge have been established.

IX. Information Sources

75-5-101, Montana Code Annotated

ARM Title 17, Chapter 30:
- Subchapter 5 - Mixing Zones in Surface and Ground Water**.**
- Subchapter 6 - Surface Water Quality Standards.
- Subchapter 7 - Nondegradation of Water Quality.
- Subchapter 12 – Montana Pollutant Discharge Elimination System (MPDES) Effluent Limitations and Standards
- Subchapter 13 - MPDES Permits

40 CFR, Parts 122, 136

DEQ Circular DEQ-7, Montana Numeric Water Quality Standards, October 2012.

DEQ Circulars DEQ-12A and 12B, Nutrient Standards and Variances, July 2014.

DEQ. Montana List of Water bodies in Need of Total Maximum Daily Load Development. 1996 and 2014 Montana 303(d) Lists.

EPA. Office of Water, U.S. EPA NPDES Permit Writers' Manual, EPA-833-B-96-003. September 2010.

EPA, 1991. *Technical Support Document for Water Quality-Based Toxics Control* (EPA/505/2-90-001), EPA, Office of Water Enforcement and Permits, March 1991.

MPDES Permit # MT0027821 File.

Prepared by: Christine Weaver
Date: October 2014

Attachment I. Schematic Flow Line Diagram